

### Amendments to the Drawings

Please replace Figs. 1-4 with amended Figs. 1-4 set forth on the Replacement Sheets enclosed herewith. The  
5 Drawings have been amended to remove copy machine marks and to adjust the margins. The amendments are limited to the presentation of the drawings. Since no changes have made to the drawings themselves, marked-up copies are not enclosed.

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## REMARKS

In response to the Examiner's objection in paragraphs 2-3 of the Office Action, Applicant has added a paragraph to page 1 of the application containing specific reference to the priority application, namely, U.S. Provisional Patent Application 60/374,512, filed on April 23, 2002.

Applicant has amended Figs. 1-4 in response to the objections of paragraphs 6-8 of the Office Action and the form PTO-948 enclosed therewith. Replacement drawings are enclosed herewith. The drawings have been amended to remove the copy machine marks and to reduce the size of the drawings in order to increase the margins. Since no changes have been made to the content of the drawings themselves, no mark-up pages are included herewith.

Claims 12 and 13 have been amended to address the informality objections of paragraph 9 of the Office Action.

Regarding the objections of paragraph 10 of the Office Action, Applicant has canceled claims 17 and 30. Claim 32 has been amended to remove reference to "commercially pure" sodium metal.

Applicant has amended claim 13 to refer to "decantation" rather than a "settling tank". Support for the amendment can be found in the Specification at page 8, lines 19-22; page 10, lines 25-28; page 13, lines 25-29; page 15, lines 15-21; page 22, lines 14-24; page 27, line 10 to page 29, line 10; page 32, lines 16-19; page 35, lines 8-17; and page 36, line 29 to page 37, line 2.

Applicant has amended claims 26 and 31.

Applicant submits that support for amended claims 26 and 31 can be found in the Specification at page 8, lines

15-18; page 10, lines 21-24; page 13, lines 1-14; page 17,  
lines 6-11; page 19, lines 9-17; page 22, lines 5-9; page  
25, lines 10-14; the table on page 27; page 31, lines 22-  
24; page 32, line 22 to page 33, line 2; page 36, line 29  
5 to page 37, line 2; and page 38, lines 10-12.

Claims 2, 4, 22 and 28 have been amended as per the  
Examiner's suggestions in paragraphs 11-14 of the Office  
Action.

In paragraphs 17-18 the Examiner has rejected claims  
10 33-35 for anticipation and obviousness in light of JP '498.  
The Examiner cites MPEP 2114, in which reference is made to  
*In Re Schreiber*, to support the position that "an apparatus  
must be distinguished from the prior art in terms of  
structure rather than function." *In Re Schreiber* involved  
15 an anticipation rejection of a conical dispensing top for a  
package of popcorn:

Schreiber filed a number of claims, and the examiner allowed many of the  
claims. Claims 1, 2, 14, and 15 were finally rejected, however, and those claims are the  
20 subjects of this appeal. Claim 1 recites:

A dispensing top for passing only several kernels of a popped popcorn  
at a time from an open-ended container filled with popped popcorn,  
having a generally conical shape and an opening at each end, the  
25 opening at the reduced end allows several kernels of popped popcorn to  
pass through at the same time, and means at the enlarged end of the top  
to embrace the open end of the container, the taper of the top being  
uniform and such as to by itself jam up the popped popcorn before the  
end of the cone and permit the dispensing of only a few kernels at a  
30 shake of a package when the top is mounted on the container.

...

Claim 1 was rejected by the examiner under 35 U.S.C. § 102(b) as being  
anticipated by Swiss Patent No. 172,689 to Harz. The Harz patent discloses "a spout for  
nozzle-ready canisters," which may be tapered inward in a conical fashion, and it states

that the spout is useful for purposes such as dispensing oil from an oil can. The examiner explained that Harz discloses a conical dispensing top for an open-ended container and concluded that "the Harz top is clearly capable of dispensing popped popcorn." Figure 5 from Harz is depicted below. [\*1476]

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Applicant submits that *In Re Schreiber* shows quite clearly that the phrase, "an apparatus must be distinguished from the prior art in terms of structure rather than function," is simply a colorful way of expressing the following two basic rules:

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- a) a claimed invention is anticipated if every element of the claim is disclosed in a single prior art reference; and
- b) a claimed invention is not distinguished from a prior art reference solely on the basis of the intended use or function thereof.

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This can be seen from the following passages and the examples recited therein by the Court in *In Re Schreiber*:

There is no dispute that the structural limitations recited in Schreiber's application are all found in the Harz reference upon which the examiner and the Board relied. Thus, to use the terms found in Schreiber's claim 1, Harz discloses a "dispensing top" that has "a generally conical shape and an opening at each end," and "means at the enlarged end of the top to embrace the open end of the container, the taper of the top being uniform." Schreiber argues, however, that Harz does not disclose that such a structure can be used to dispense popcorn from an open-ended popcorn container.

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Although Schreiber is correct that Harz does not address the use of the disclosed structure to dispense popcorn, the absence of a disclosure relating to function does not defeat the Board's finding of anticipation. It is well settled that the recitation of a new intended use for an old product does not make a claim to that old product patentable. See *In re Spada*, 911 F.2d 705, 708, 15 U.S.P.Q.2D (BNA) 1655, 1657 (Fed. [\*8] Cir. 1990) ("The discovery of a new property or use of a previously known composition, even when

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that property and use are unobvious from prior art, can not impart patentability to claims to the known composition."); *Titanium Metals Corp. of Am. v. Banner*, 778 F.2d 775, 782, 227 U.S.P.Q. (BNA) 773, 778 (Fed. Cir. 1985) (composition claim reciting a newly discovered property of an old alloy did not satisfy section 102 because the alloy itself was not new); *In re Pearson*, 494 F.2d 1399, 1403, 181 U.S.P.Q. (BNA) 641, 644 (CCPA 1974) (intended use of an old composition does not render composition claim patentable); *In re Zierden*, 56 C.C.P.A. 1223, 411 F.2d 1325, 1328, 162 U.S.P.Q. (BNA) 102, 104 (CCPA 1969) ("Mere statement of a new use for an otherwise old or obvious composition cannot render a claim to the composition patentable."); *In re Sinex*, 50 C.C.P.A. 1004, 309 F.2d 488, 492, 135 U.S.P.Q. (BNA) 302, 305 (CCPA 1962) (statement of intended use in an apparatus claim failed to distinguish over the prior art apparatus); *In re Hack*, 44 C.C.P.A. 954, 245 F.2d 246, 248, 114 U.S.P.Q. (BNA) 161, 162 (CCPA 1957) ("the grant of a patent on a composition or a machine cannot be predicated on a new use of that machine or composition"); *In re Benner*, 36 C.C.P.A. 1081, 174 F.2d 938, 942, 82 [\*\*9] U.S.P.Q. 49, 53 (CCPA 1949) ("no provision has been made in the patent statutes for granting a patent upon an old product based solely upon discovery of a new use for such product"). Accordingly, Schreiber's contention that his structure will be used to dispense popcorn does not have patentable weight if the structure is already known, regardless of whether it has ever been used in any way in connection with popcorn.

Each one of the examples recited in the above passage refers to a new use of an old apparatus or composition. In other words, a new use for an apparatus or composition disclosing all of the characteristics of the claims in question. Similarly, it is quite clear that the Court in *In Re Schreiber* found Schreiber's claims to be anticipated because the prior art Harz device disclosed every single element thereof. The Court held, correctly, that Schreiber's claimed invention could not be distinguished from Harz solely on the basis of the intended use or function:

The examiner and the Board both addressed the question whether the functional limitations of Schreiber's claim gave it patentable weight and concluded that they did not, because those limitations were found to be inherent in the Harz prior art reference. To

begin with, contrary to the characterization in the dissent, nothing in Schreiber's claim suggests that Schreiber's container is "of a different shape" than Harz's. In fact, as shown above, an embodiment according to Harz (Fig. 5) and the embodiment depicted in figure 1 of Schreiber's application have the same general shape. For that reason, the examiner was justified in concluding that the opening of a conically shaped top as disclosed by Harz is inherently of a size sufficient to "allow several kernels of popped popcorn to pass through at the same time" and that the taper of Harz's conically shaped top is inherently of such a shape "as to by itself jam up the popped popcorn before the end [\*\*12] of the cone and permit the dispensing of only a few kernels at a shake of a package when the top is mounted on the container." The examiner therefore correctly found that Harz established a prima facie case of anticipation.

The Court concluded that the apparatuses of Harz and Schreiber were identical, and that the apparatus of Harz was capable of performing the intended function of the apparatus of Schreiber, namely, dispensing popcorn. It was on that basis that Harz was found to anticipate Schreiber's invention.

In contrast, Applicant submits that the JP '498 patent does not disclose all of the elements of claim 33 and, furthermore, the apparatus of JP '498 cannot perform the intended function of the apparatus of claim 33.

Claim 33 of the present application, as currently amended, recites "a heater for controlling the temperature of said mixture and maintaining said molten sodium-containing alkali metal in a molten state, said heater having an operating range with an upper limit at least equal to a temperature of molten sodium." Sodium melts at 97.8°C. Therefore, the heater of claim 33 must be capable of maintaining the contents of the reaction vessel at a temperature of 97.8°C or more. JP '498 specifically recites a heater for heating an object to 60-80°C, a range well below the melting point of sodium. JP '498 does not

disclose an apparatus having a heater capable of maintaining sodium in a molten state. Therefore, JP '498 does not disclose all of the elements of claim 33.

Because it does not disclose a heater capable of heating to 97.8°C, the apparatus disclosed by JP '498 cannot fulfill the intended function of the apparatus of claim 33. This is in contrast to *In Re Schreiber*, where the prior art device of Harz was found to be capable of dispensing popcorn even though it was *intended* for pouring oil. Regardless of the intended function of the apparatus of JP '498, it is incapable of treating PCB-contaminated media according to the invention describe in claim 33.

Claim 33 of the present application, as currently amended, also recites "an audio frequency sonicator." JP '498 discloses either an "ultrasonic device" or an "ultrasonic apparatus," however, it does not disclose an audio frequency sonicator. Therefore, JP '498 does not disclose all of the elements of claim 33.

Ultrasonic apparatuses have characteristics, which make them inappropriate for use in the present invention. A key difference between an ultrasonic device and the audio frequency sonicator is that the amplitude of vibration for the audio frequency sonicator is greater than that obtainable from ultrasonic systems, thus providing highly desirable mechanical "shaking" for the disruption of the PCB-media physical bonds. An ultrasonic apparatus is unable to achieve satisfactory separation of the PCB from the media.

A second key difference is that, in an audio frequency sonicator the relatively sophisticated, complex and sensitive electromechanical generation apparatus is

uncoupled or isolated (see, for example, U.S. Pat. Nos. 4,941,134 and 5,005,773 issued to Nyberg et al. and referred to at pages 5, 6, 8 and 9 of the present application) from the actual mixing energy application. In an ultrasonic device, the transducer or horn would be physically exposed to the agitated media, (i.e. in the present context, soil) which could cause highly undesirable irreversible, abrasive damage.

A third key difference between an ultrasonic device and the audio frequency sonicator is the relative power output of each device. The audio frequency sonicators of the current invention have been demonstrated at 75 kilowatt capacity unlike ultrasonic devices delivering at best sub-kilowatt power. Therefore ultrasonic devices cannot match the desirable throughput of audio frequency sonicators.

A fourth key difference between an ultrasonic device and the audio frequency sonicator is that the audio frequency sonicator does not generate acoustic cavitation directly from surface vibrations. Therefore it does not suffer from acoustic cavitation collapse, which, for ultrasonic devices, is a real problem on a large scale. Acoustic cavitation collapse can cause serious destructive abrasion even in the absence of abrasive media. For instance, acoustic cavitation collapse is responsible for abrasion in marine propellor blades. This is why suppliers of ultrasonic horns sell replaceable tips for horns because cavitation damage reduces the overall length of the horns. Replacement tips are required to restore them to optimum length. Applicant encloses herewith an article by D. Krefting, et al., "High-Speed Observation of Acoustic Cavitation Erosion in Multibubble Systems," Ultrasonics



Sonochemistry (11) 2004 119-123, in which acoustic cavitation collapse is discussed in greater depth.


Accordingly, Applicant submits that JP '498 does not disclose all of the elements of claim 33 of the present application. Furthermore, Applicant submits that the apparatus of JP '498 cannot perform the function of the apparatus of claim 33.

Accordingly, Applicant submits that claim 33 is not anticipated by JP '498.

Favourable consideration of this application is solicited.

Respectfully submitted,

Dated: Aug. 2, 2005

By:   
Clifford W. Vermette  
Reg. No. 30,018  
Attorney for Applicant

c/o Vermette & Co.  
Box 40 Granville Square  
230 - 200 Granville Street  
Vancouver, British Columbia  
Canada V6C 1S4  
Tel: (604) 331 - 0381  
Fax: (604) 331 - 0382